



Hydrogeology at Coles Hill

JP Gannon

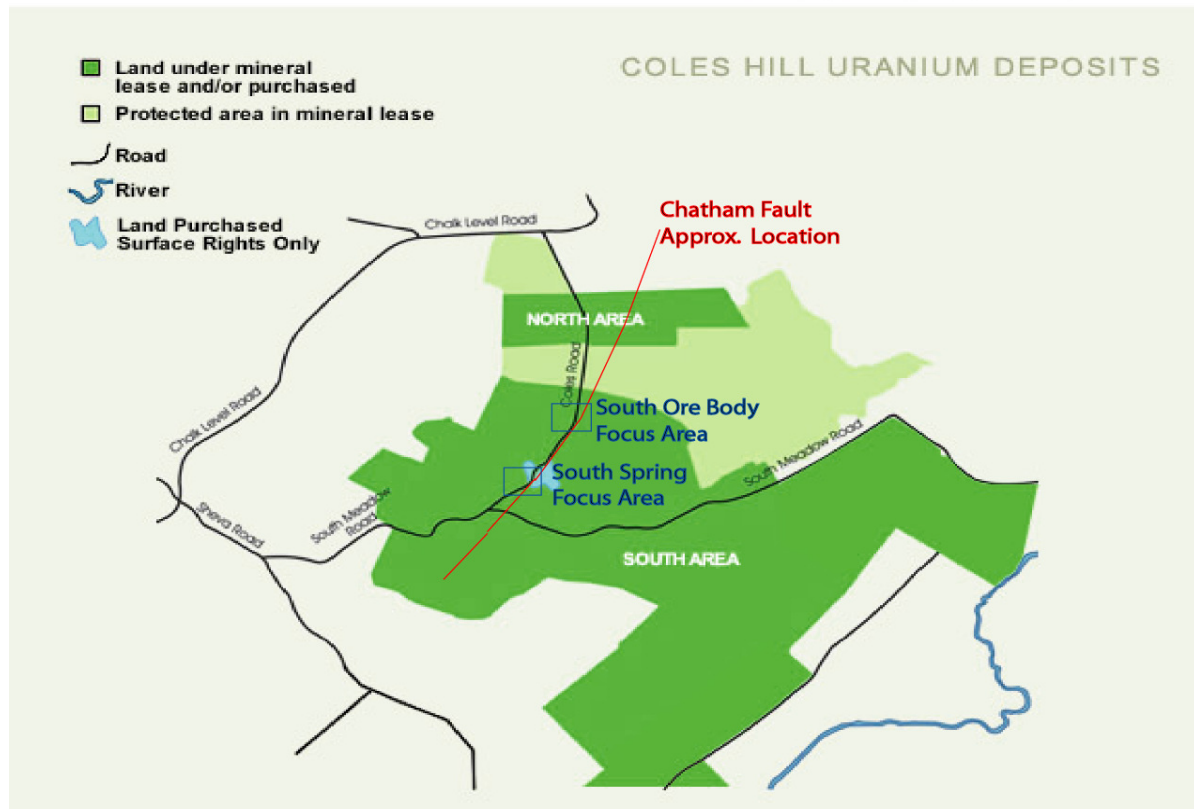
Advisor: Dr. Thomas Burbey

Outline

- General Overview
- Field Processes
- Current Focus Area
- Suspected Coles Hill Hydro
- Future Work



Where are we?



Piedmont Hydrogeology

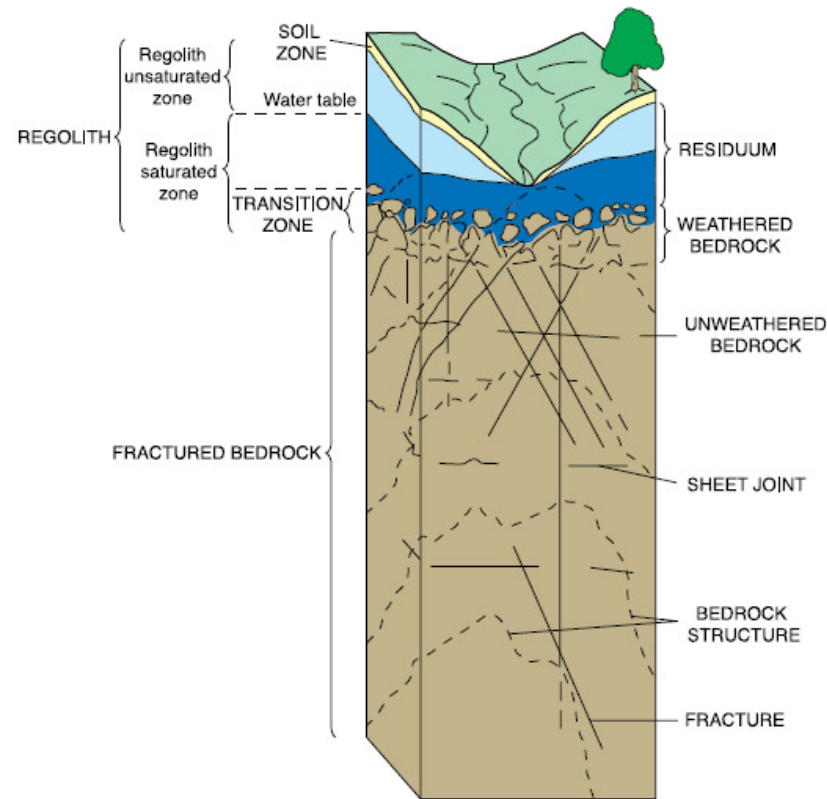


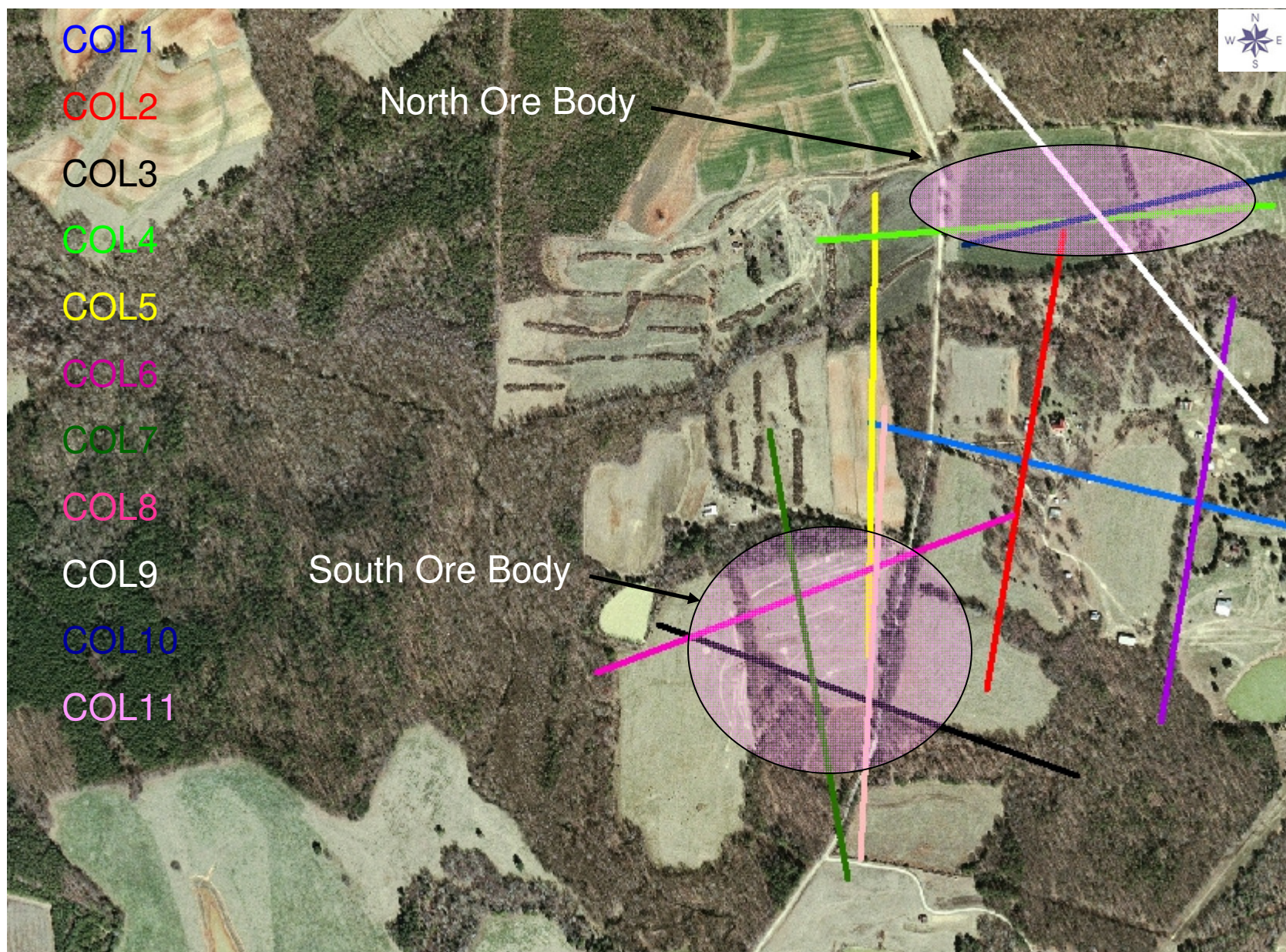
Figure 2. Principal hydrogeologic components of regolith and bedrock in the Valley and Ridge, Blue Ridge, and Piedmont Physiographic Provinces. (From Daniel and others, 1997, fig. 4.)

Swain, L.A., Mesko, T.O., and Hollyday, E.F., 2004, Summary of the hydrogeology of the Valley and Ridge, Blue Ridge, and Piedmont Physiographic Provinces in the Eastern United States: USGS Professional Paper 1422-A

Resistivity Work

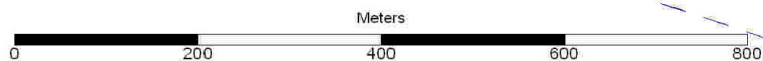
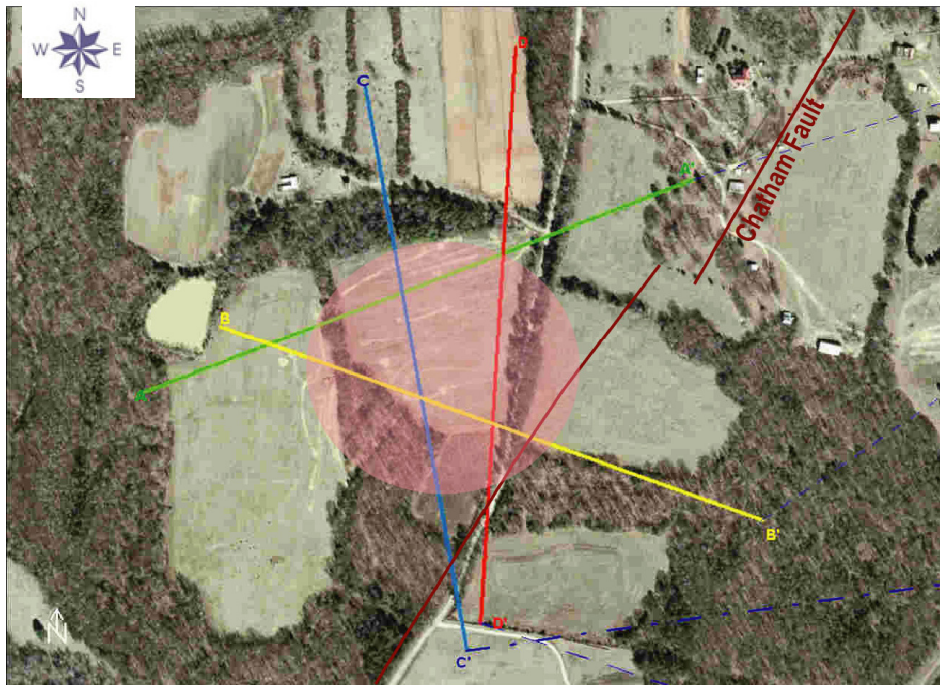
- Goals
 - Image Fault
 - Find Possible Fracture Locations
 - Determine Possible Groundwater Flow Paths
 - Determine Ideal Monitoring Well Locations

Resistivity Coverage

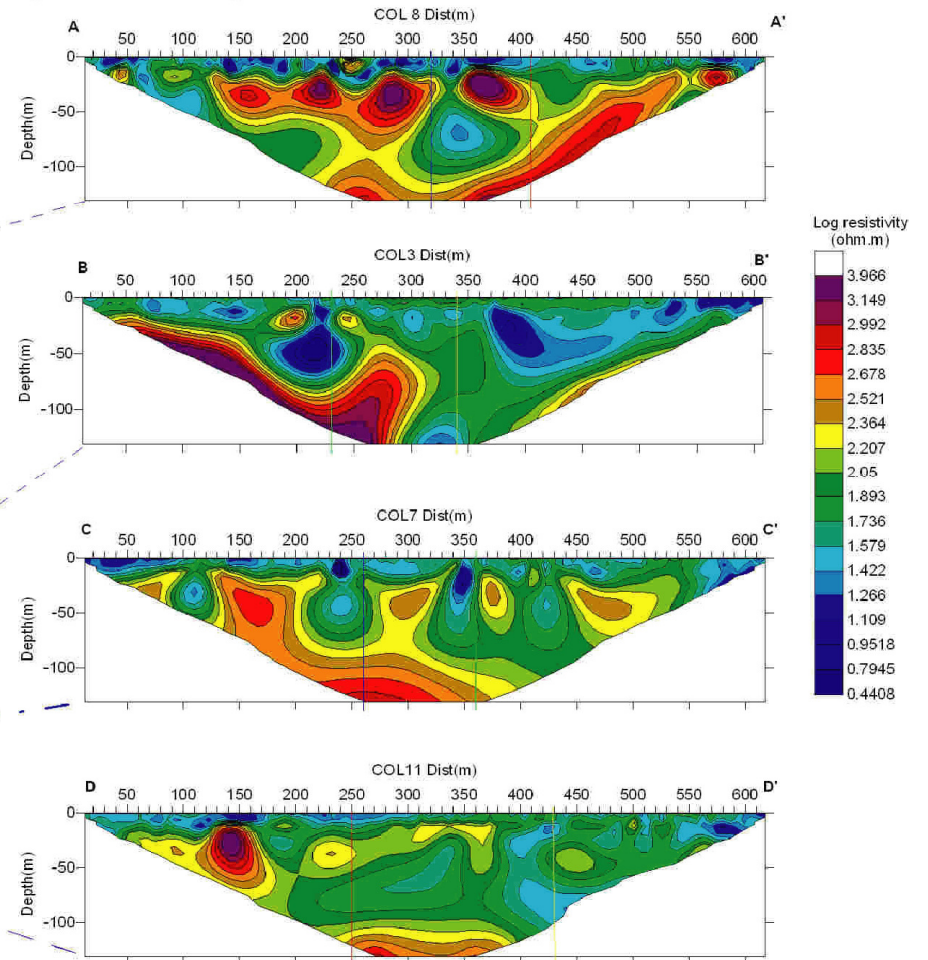


Close up of South Ore Body

Coles Hill South Ore Body Resistivity Lines



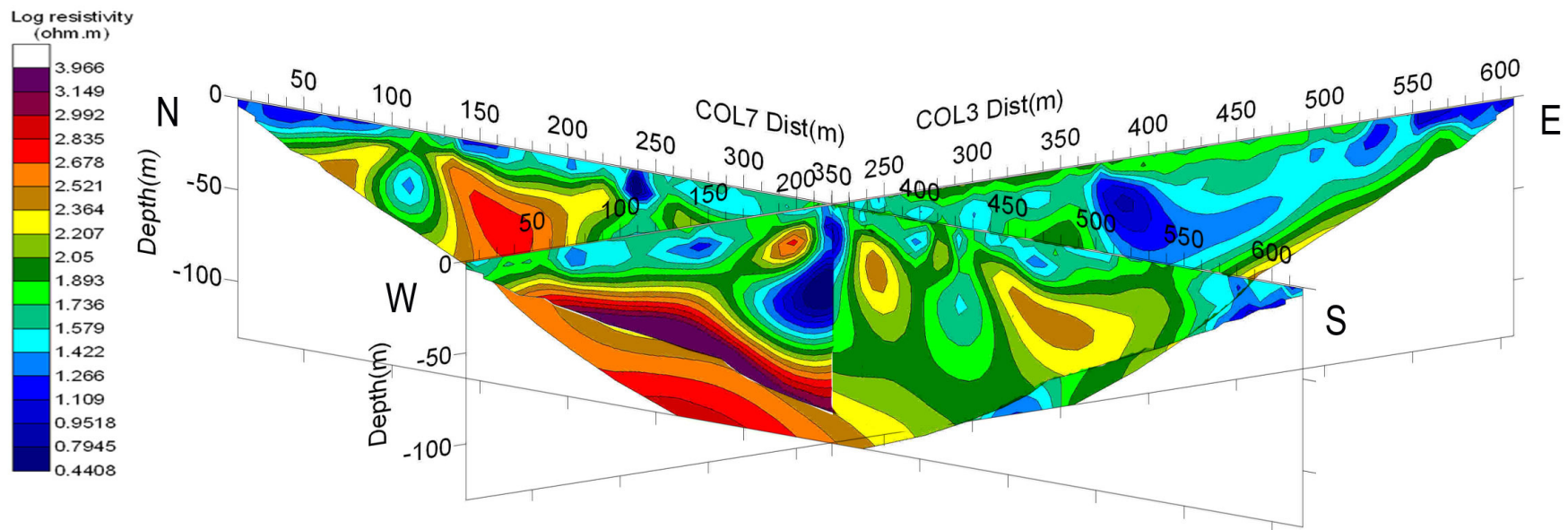
 Ore Body



Corresponding vertical colored lines represent line intersections.
(ie: COL8 and COL11 intersect at the red line on both)

Visualization of low resistivity zone at south ore body.

3-Dimensional Intersection of lines COL7 and COL3

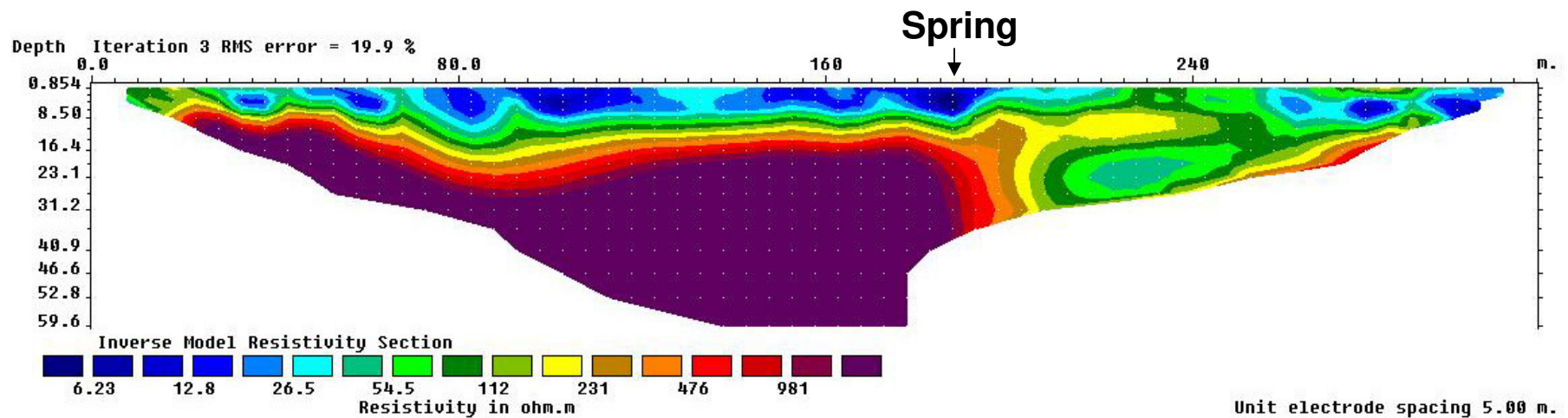


Resistivity Summary

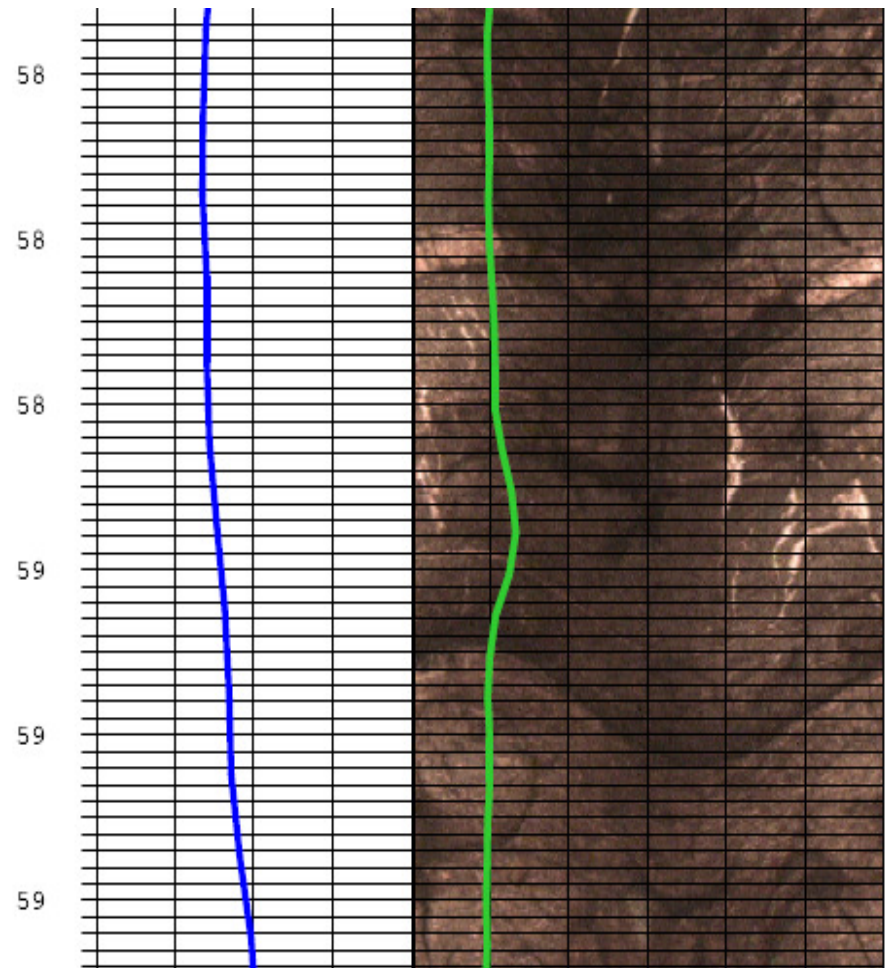
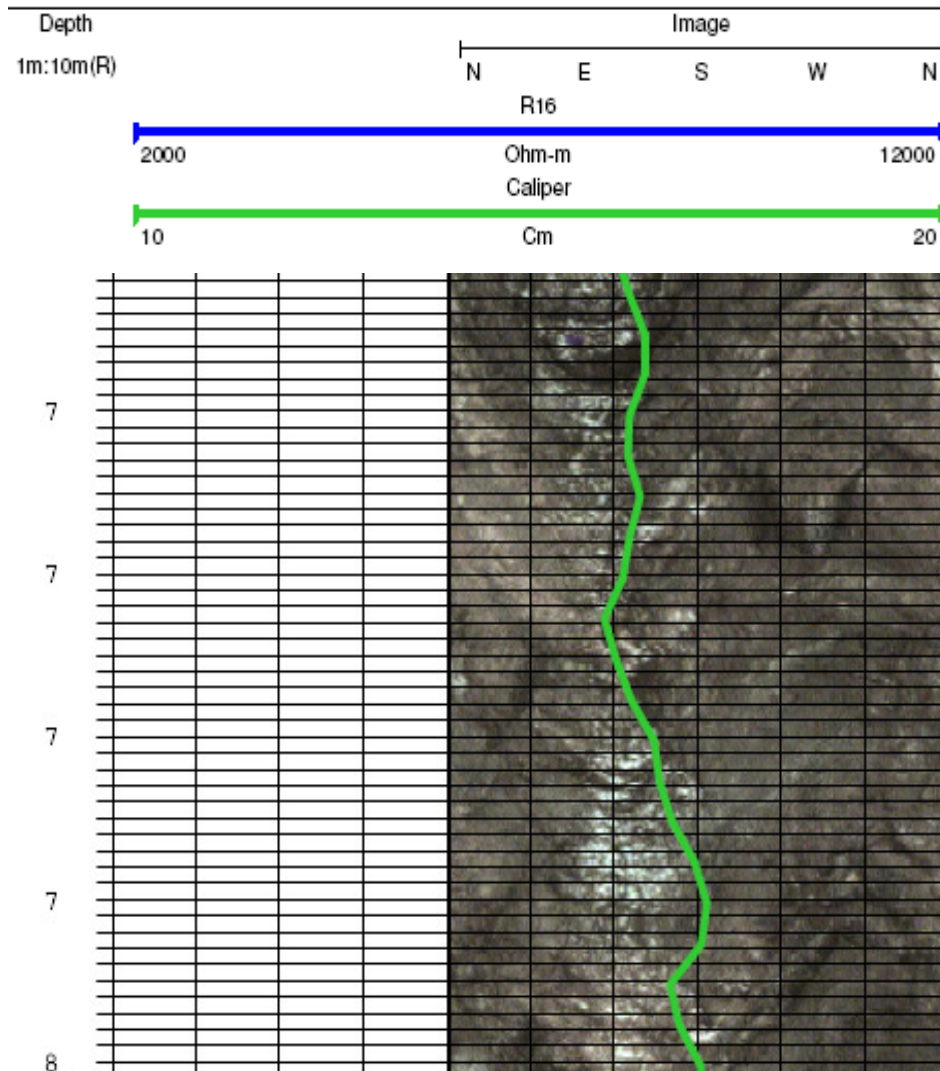
- Comprehensive coverage
- Many zones of saturation seen
- No data to define these zones
- Very valuable information if paired with well data

Current Focus Area

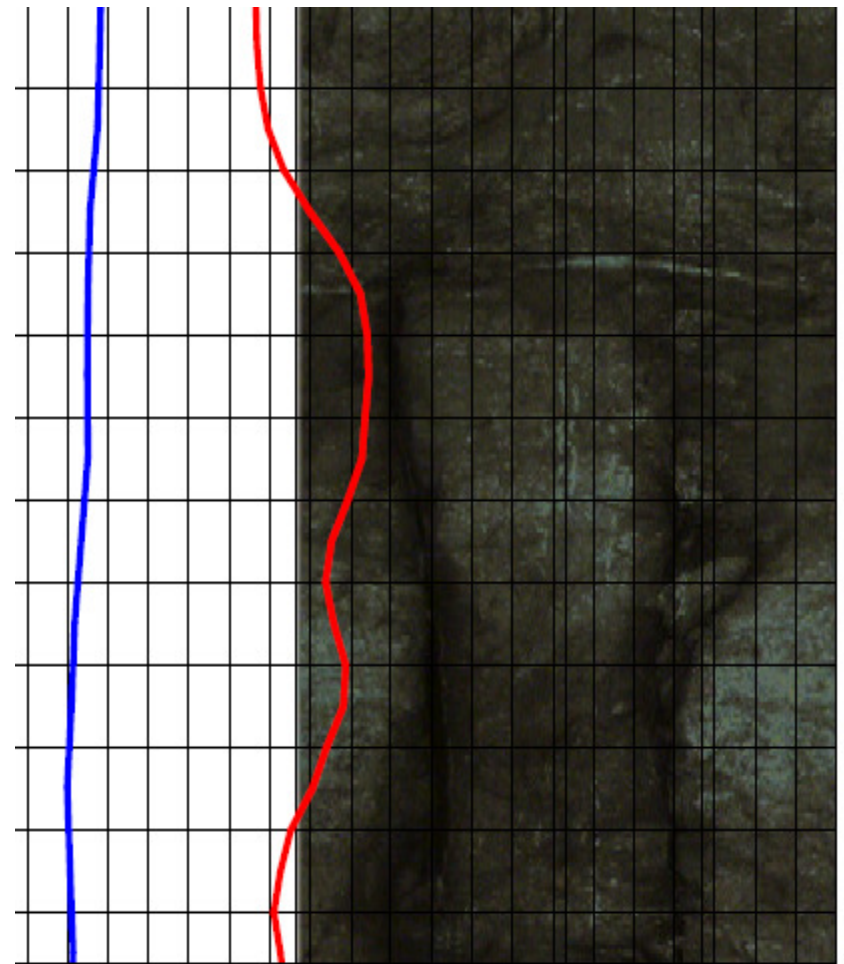
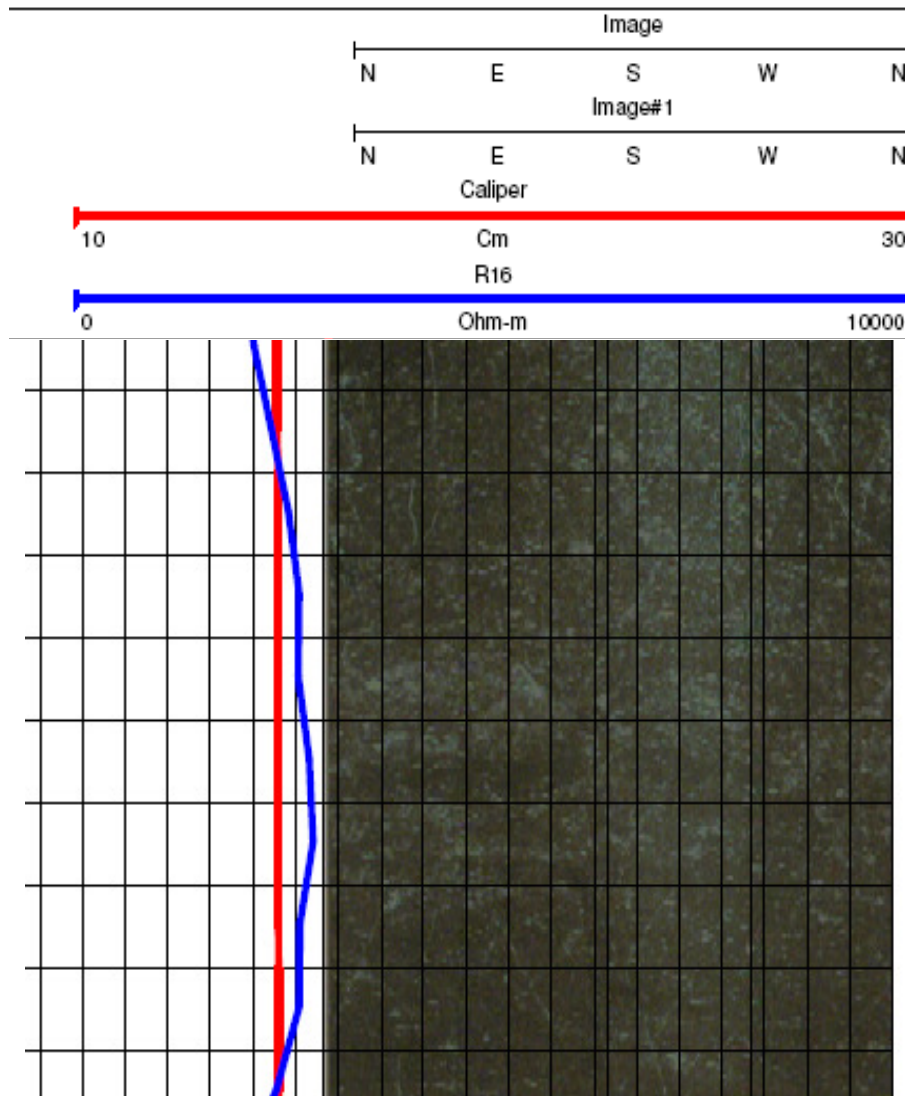
- Spring at local topographic high point
- Spring is near intersection of Chatham fault and possible cross fault.

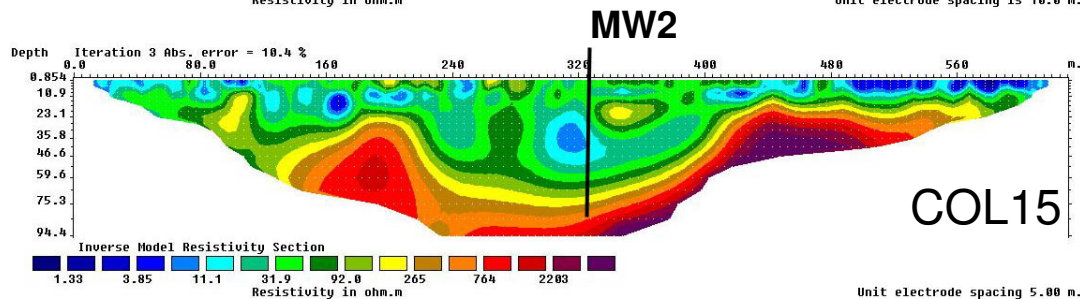
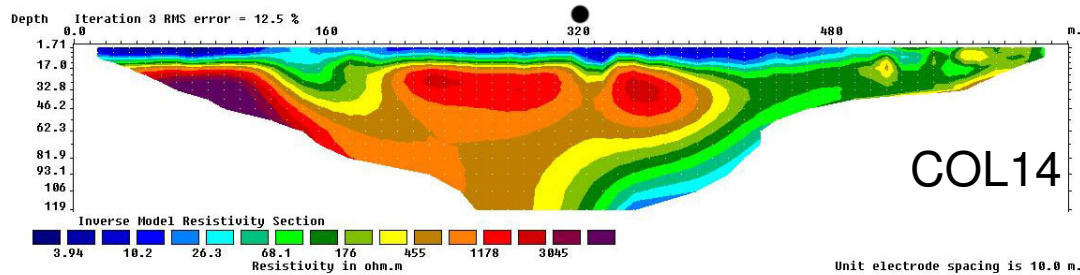
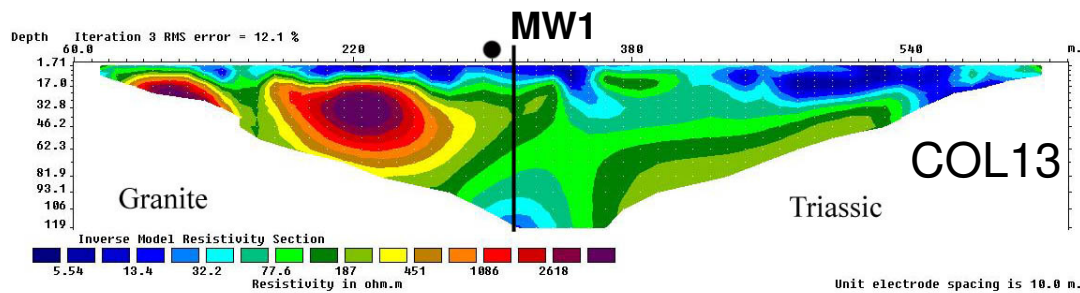


Johns1 Log

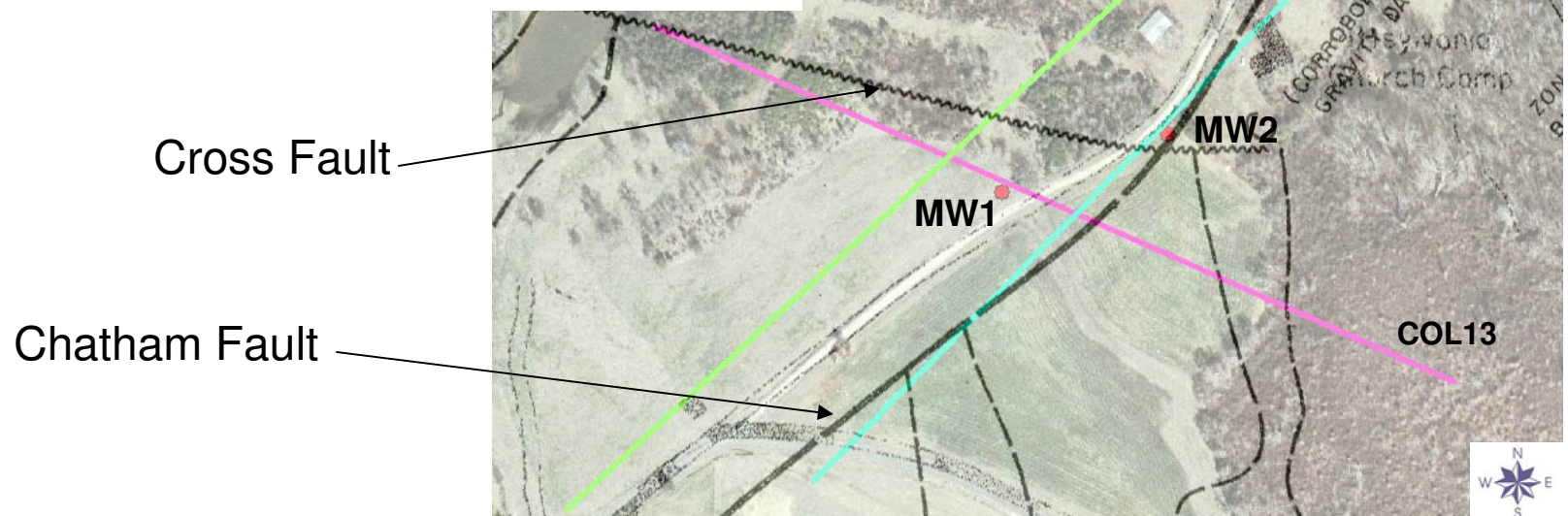


VAUTrail Log

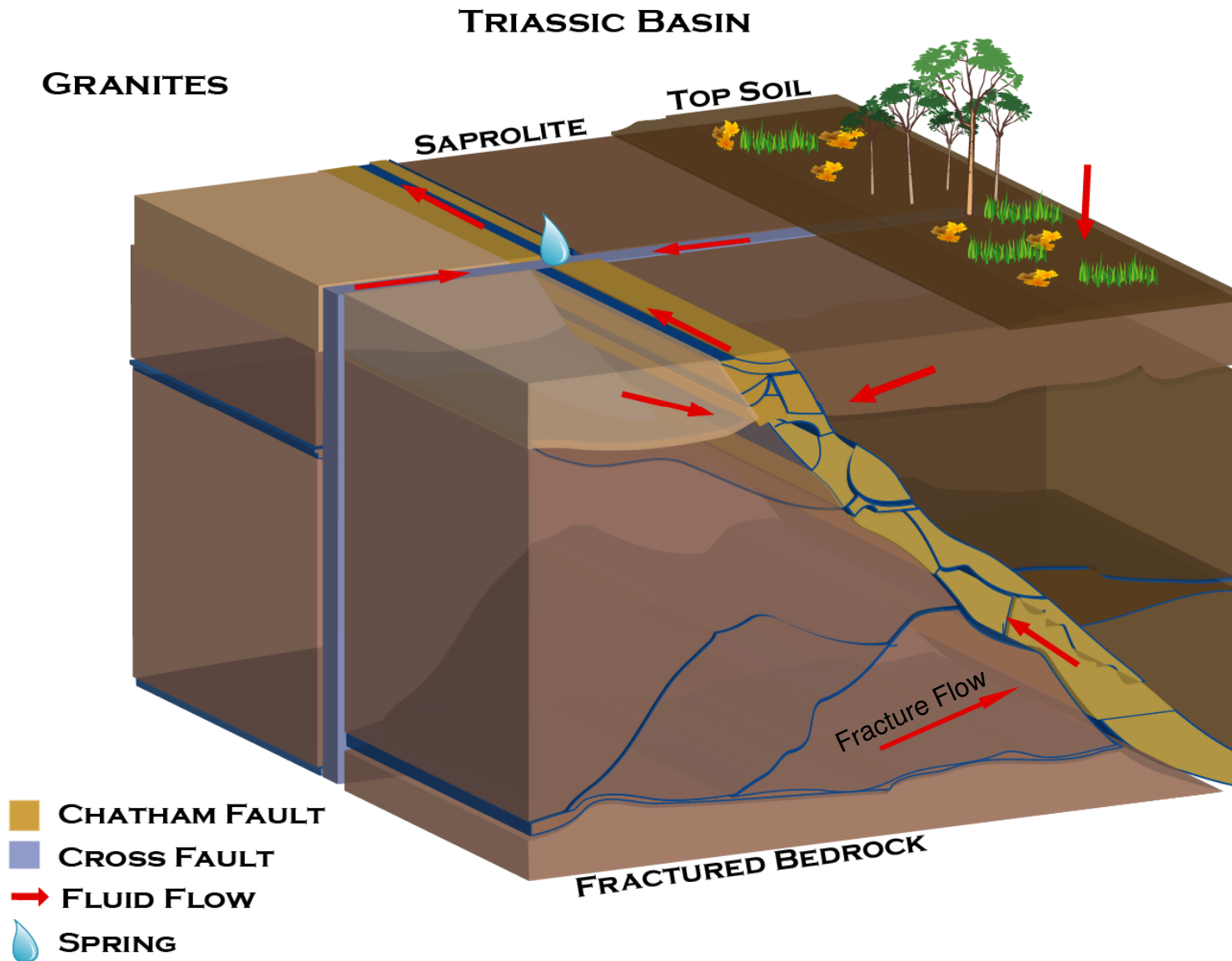




More Resistivity work further
Defined the South Spring area
And helped to find the best
Locations for two monitoring
wells



Hypothesized Hydrogeology of Coles Hill, VA



Future Work

- Drill two wells at South Spring Area
- Log Wells and Perform Pump Tests
- Age dating of water from 2 wells
 - Carbon 14
 - Tritium, He-4/Neon, He-3/He-4
 - CFCs



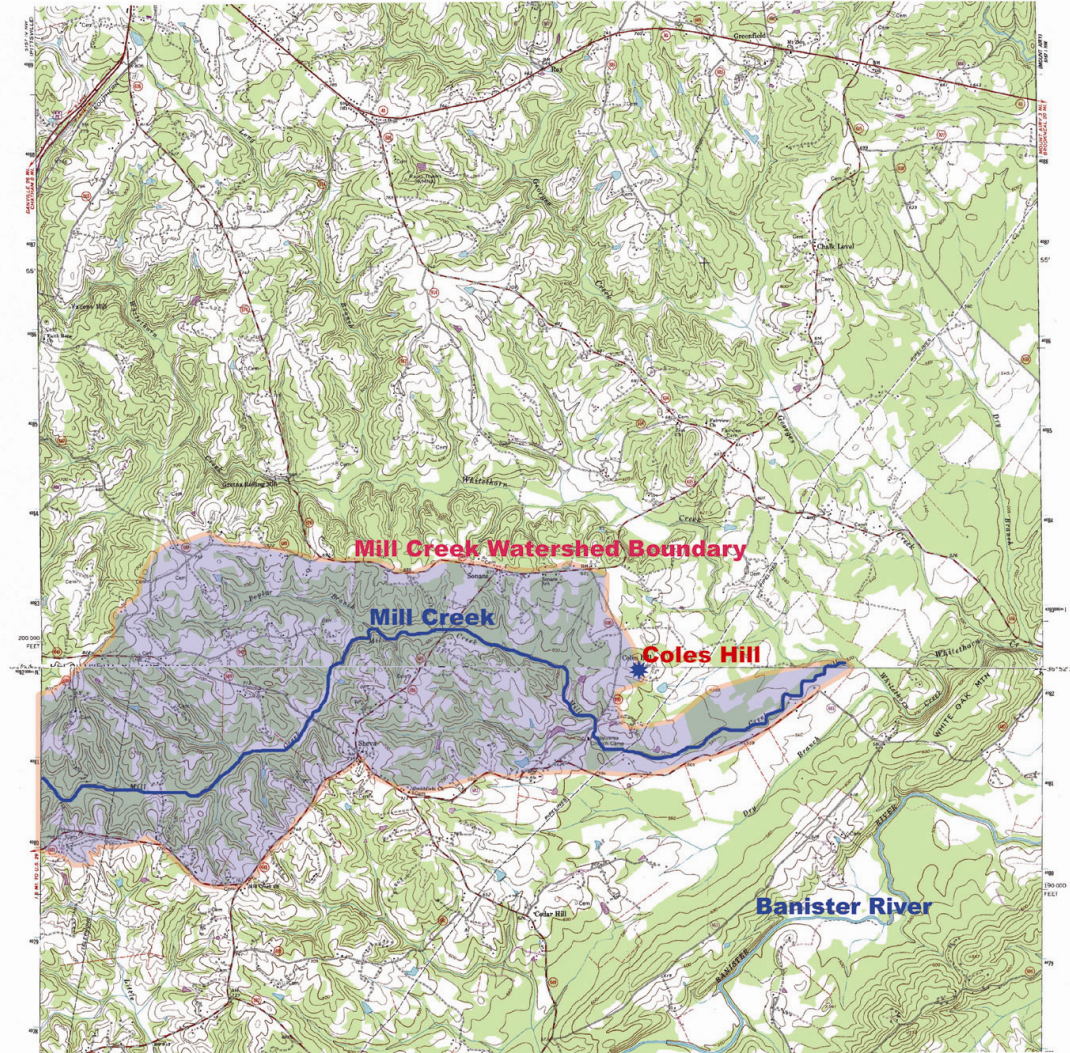
Questions?

Watershed Map for Mill Creek

Coles Hill

Pittsylvania County, Virginia

Blue shaded area represents area draining to Mill Creek.



Mapped, edited, and published by the Geological Survey
 Control by 1922 and 1924
 Topography by photogrammetric methods from aerial
 photographs taken 1952. Field checked 1964.
 Polygons projected. 12,000-foot grid lines based on
 Virginia coordinate system, south zone.
 1000-meter Universal Transverse Mercator grid ticks,
 zone 17, shown in blue.
 1987 North American Datum
 To place on the projected North American Datum 1983
 move the projection lines 17 meters south and
 22 meters west as shown by dotted center ticks.
 Fine red dashed lines indicate selected base and field lines where
 generally visible on aerial photographs. This information is uncorrected
 information not field checked. Map edited 1983.

LOW AND HIGH WATER
 INDICATED BY DOTTED LINE
 REVISIONS SHOWN IN PURPLE AND MODIFIED IN
 COOPERATION WITH COMMONWEALTH OF VIRGINIA
 A POLAR DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

SCALE 1:24,000
 1 MILE
 1 KILOMETER
 1000 2000 3000 4000 5000 6000 7000 8000 9000
 FEET
 METERS
 CONTOUR INTERVAL 20 FEET
 NATIONAL GEODETIC DATUM OF 1983

ROAD CLASSIFICATION
 Medium duty Light duty
 Unimproved dirt
 State Route